

# Newton's Laws Webquest

## Part 1

Explain each of Newton's three laws:

A. Law of Inertia

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B. Law of Force and Acceleration

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C. Law of Action/Reaction

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## Part 2

1. Investigate and apply Newton's Laws to vehicle restraints.

a. Go to <http://regentsprep.org/Regents/physics/phys01/accident/default.htm>

b. Choose one of the eight videos and observe Newton's Laws in relation to car crashes.

c. Describe all the ways that Newton's Laws can apply in a car crash.

d. Compare and contrast the results of a crash while the passengers are **not** wearing seat belts and while they are wearing seat belts.

2. Investigate and apply Newton's Laws to sports activities.

a. Go to <http://www.exploratorium.edu/baseball/scientificslugger.html> The Scientific Slugger.

b. Read and fill in the blanks:

The distance a baseball travels depends on \_\_\_\_\_ primary factors: the \_\_\_\_\_ at which the ball leaves the bat, and how \_\_\_\_\_ the ball is hit. The \_\_\_\_\_ of the ball depends on both the speed of the \_\_\_\_\_ and the speed of the \_\_\_\_\_. Gravity is always pulling \_\_\_\_\_ on the ball. If you hit the ball straight up, it spends quite a bit of time in the air, but doesn't travel far from home plate. If you hit the ball horizontally, as in a line drive, the ball moves away from home plate at maximum velocity, but quickly hits the ground because of \_\_\_\_\_ -- still not very far from home plate. To maximize your hitting \_\_\_\_\_, you need to have both a high horizontal \_\_\_\_\_ AND you need to keep the ball in the air for a \_\_\_\_\_ time. You can do this by hitting the ball at an \_\_\_\_\_ angle.

c. Try to hit a home run. Change one variable at a time. Record each of your variables below.

Type of Pitch	Pitch Speed	Angle of the Ball	Bat Speed	Distance	Result (home run or not?)

3. Investigate and apply Newton's Laws to amusement park rides.

a. Go to <http://www.learner.org/interactives/parkphysics> Amusement Park Physics

b. Read and answer the questions:

i. What activities are more dangerous than riding an amusement park ride?

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ii. What drives the motion of a roller coaster?

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iii. Name the three types of wheels on a roller coaster car.

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iv. Compare and contrast wooden vs. steel roller coasters:

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c. Click the icon in the text that says 'Design a Roller Coaster'

i. List the constants for the experiment

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ii. Click 'begin'

1. Height of first hill \_\_\_\_\_

2. Slope of the hill \_\_\_\_\_

3. Exit path \_\_\_\_\_

4. Height of the second hill \_\_\_\_\_

5. Shape of the loop \_\_\_\_\_

iii. Did your roller coaster pass the safety test? \_\_\_\_\_

iv. Did your roller coaster pass the fun test? \_\_\_\_\_

4. Investigate and apply Newton's Laws to tectonic activities

a. Go to [http://www.jclahr.com/science/earth\\_science/animate/](http://www.jclahr.com/science/earth_science/animate/)

b. At the bottom of the page, click on the link for the Quicktime video. Play the video and answer the questions.

i. Which of Newton's laws applies to the rock that gets stuck while the plate is subducting into the mantle? \_\_\_\_\_

ii. Which law causes the land to bulge up above the subducting plate? \_\_\_\_\_

iii. Which law causes tsunamis to occur when earthquakes take place in the water?

\_\_\_\_\_

iv. Explain the energy transformations involved when the plate subducts and creates an earthquake.

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5. Investigate and apply Newton's Laws to rocket launches

a. Go to <http://www.sciencenetlinks.com/interactives/gravity.html> and click 'start'

b. You will have five different missions – to dock the rocket at the orbiting space station. For each trial, change the amount of thrust and the angle of the launch. Press the launch button to test your variables. Record variables for successful launches below:

Round	Thrust	Angle
1.		
2.		
3.		
4.		
5.		

Once you have completed this webquest, submit it and then click the link below to begin the next assignment:

<http://www.questgarden.com/86/07/1/100228175329/process.htm>